What is claimed is:

1. An isolated DNA comprising:

(a) a nucleic acid sequence that encodes a polypeptide with the ability to co-stimulate a T cell, wherein the nucleic acid sequence hybridizes under stringent conditions to the complement of a sequence that encodes a polypeptide with an amino acid sequence with SEQ ID NO:5; or

(b) the complement of the nucleic acid sequence.

2. The DNA of claim 1, wherein the nucleic acid sequence encodes a polypeptide comprising an amino acid sequence with SEQ ID NO:5.

3. The DNA of claim 1, wherein the nucleic acid sequence has a sequence of SEQ ID NO:6.

4. An isolated co-stimulatory polypeptide encoded by the DNA of claim 1.

5. The isolated polypeptide of claim 4, wherein the polypeptide comprises an amino acid sequence of amino acid residue 31 to amino acid residue 282 of SEQ ID NO:5, or said amino acid sequence but with one or more conservative substitutions.

6. The isolated polypeptide of claim 5, wherein the polypeptide comprises an amino acid sequence of SEQ ID NO:5, or said amino acid sequence but with one or more conservative substitutions.

7. A vector comprising the DNA of claim 1.

8. The vector of claim 7, wherein the nucleic acid sequence is operably linked to a regulatory element which allows expression of said nucleic acid sequence in a cell.

9. A cell comprising the vector of claim 7.

10. A method of co-stimulating a T cell, the method comprising contacting the T cell with the polypeptide of claim 4.

11. The method of claim 10, wherein the contacting comprises culturing the polypeptide with the T cell *in vitro*.

12. The method of claim 10, wherein the T cell is in a mammal.

13. The method of claim 12, wherein the contacting comprises administering the polypeptide to the mammal.

14. The method of claim 12, wherein the contacting comprises administering a nucleic acid encoding the polypeptide to the mammal.

15. The method of claim 12, comprising:

(a) providing a recombinant cell which is the progeny of a cell obtained from the mammal and has been transfected or transformed *ex vivo* with a nucleic acid encoding the polypeptide so that the cell expresses the polypeptide; and

(b) administering the cell to the mammal.

16. The method of claim 15, wherein the recombinant cell is an antigen presenting cell (APC) and expresses the polypeptide on its surface.

17. The method of claim 16, wherein, prior to the administering, the APC is pulsed with an antigen or an antigenic peptide.

18. The method of claim 15, wherein the cell obtained from the mammal is a tumor cell.

19. The method of claim 12, wherein the mammal is suspected of having an immunodeficiency disease.

20. A method of identifying a compound that inhibits an immune response, the method comprising:

(a) providing a test compound;

(b) culturing, together, the compound, the polypeptide of claim 4, a T cell, and a T cell activating stimulus; and

(c) determining whether the test compound inhibits the response of the T cell to the stimulus, as an indication that the test compound inhibits an immune response.

21. The method of claim 20, wherein the stimulus is an antibody that binds to a T cell receptor or a CD3 polypeptide.

22. The method of claim 20, wherein the stimulus is an alloantigen or an antigenic peptide bound to a major histocompatibility complex (MHC) molecule on the surface of an antigen presenting cell (APC).

23. The method of claim 22, wherein the APC is transfected or transformed with a nucleic acid encoding the polypeptide and the polypeptide is expressed on the surface of the APC.

24. A method of identifying a compound that enhances an immune response, the method comprising:

(a) providing a test compound;

(b) culturing, together, the compound, the polypeptide of claim 4, a T cell, and a T cell activating stimulus; and

(c) determining whether the test compound enhances the response of the T cell to the antigen, as an indication that the test compound enhances an immune response.

25. The method of claim 24, wherein the stimulus is an antibody that binds to a T cell receptor or a CD3 polypeptide.

26. The method of claim 25, wherein the stimulus is an alloantigen or an antigenic peptide bound to a MHC molecule on the surface of an APC.

27. The method of claim 26, wherein the APC is transfected or transformed with a nucleic acid encoding the polypeptide and the polypeptide is expressed on the surface of the APC.

28. An antibody that binds specifically to the polypeptide of claim 4.

29. The antibody of claim 28, wherein the antibody is a polyclonal antibody.

30. The antibody of claim 28, wherein the antibody is a monoclonal antibody.

31. The antibody of claim 28, wherein the antibody binds to the polypeptide with SEQ ID NO:5.

32. A cell comprising the vector of claim 8.

33. A method of producing a polypeptide that co-stimulates a T cell, the method comprising culturing the cell of claim 32 and purifying the polypeptide from the culture.

34. A fusion protein comprising a first domain joined to at least one additional domain, wherein the first domain comprises a polypeptide of claim 4.

35. The fusion protein of claim 34, wherein the at least one additional domain comprises the constant region of an immunoglobulin heavy chain or a fragment thereof.

36. A nucleic acid molecule encoding the fusion protein of claim 35.

37. A vector comprising the nucleic acid molecule of claim 36.

38. The vector of claim 37, wherein the nucleic acid molecule is operably linked to a regulatory element which allows expression of the nucleic acid molecule in a cell.

39. A cell comprising the vector of claim 38.

40. A method of producing a fusion protein, the method comprising culturing the cell of claim 39 and purifying the fusion protein from the culture.

41. A method of co-stimulating a T cell, the method comprising contacting the T cell with:

(a) a first co-stimulatory polypeptide selected from the group consisting of (i) B7-H1, (ii) B7-H2, (iii) B7-H3, (iv) B7-H4, (v) a functional fragment of any of (i) - (iv), and (vi) any of (i) - (v) but with one or more conservative substitutions; and

(b) one or more additional co-stimulatory polypeptides selected from the group consisting of (vi) B7-1, (vii) B7-2, (viii) B7-H1, (ix) B7-H2, (x) B7-H3, (xi) B7-H4, (xii) a functional fragment of any of (vi) - (xi), and (xii) any of (vi) - (xii) but with one or more conservative substitutions.

42. The method of claim 41, wherein the contacting comprises culturing the first co-stimulatory polypeptide and the one or more additional co-stimulatory polypeptides with the T cell *in vitro*.

43. The method of claim 41, wherein the T cell is in a mammal.

44. The method of claim 43, wherein the contacting comprises administering the first co-stimulatory polypeptide and the one or more additional co-stimulatory polypeptides to the mammal.

45. The method of claim 43, wherein the contacting comprises administering one or more nucleic acids encoding the first co-stimulatory polypeptide and the one more additional co-stimulatory polypeptides to the mammal.

46. The method of claim 43, comprising:

(a) providing a recombinant cell which is the progeny of a cell obtained from the mammal and which has been transfected or transformed *ex vivo* with one or more nucleic acids encoding the first co-stimulatory polypeptide and the one or more additional polypeptides so that the cell expresses the first co-stimulatory polypeptide and the one or more additional co-stimulatory polypeptides; and

(b) administering the cell to the mammal.

47. The method of claim 43, comprising;

(a) providing a first recombinant cell which is the progeny of a cell obtained from the mammal and which has been transfected or transformed *ex vivo* with a nucleic acid encoding the first co-stimulatory polypeptide;

(b) providing one or more additional recombinant cells each of which is the progeny of a cell obtained from the mammal and each of which has been transfected or transformed *ex vivo* with a nucleic acid encoding one of the additional one or more co-stimulatory polypeptides; and

(c) administering the first cell and the one or more additional cells to the mammal.

48. The method of claim 46, wherein the recombinant cell is an antigen presenting cell (APC) and expresses the first co-stimulatory polypeptide and the one or more additional co-stimulatory polypeptides on its surface.

49. The method of claim 48, wherein, prior to the administering, the APC is pulsed with an antigen or an antigenic peptide.

50. The method of claim 46, wherein the cell obtained from the mammal is a tumor cell.

51. The method of claim 43, wherein the mammal is suspected of having an immunodeficiency disease.

52. The method of claim 10, wherein the polypeptide co-stimulates the production of interferon-γ by the T cell.